

Orono. The colony was feeding on the stem and was accompanied by ants. Alate and apterous females and nymphs were taken at this time. Later, August 24, in the same locality an apterous female and nymph of this aphid were found. The body of the apterous female was glistening bronze and thickly hairy. The nymph was cinnamon brown. This has not been compared with actual specimens from Russia, but the figures accompanying the original description seem in this case adequate for determination. There is no previous record of this species for America.

EASTERN APHIDS, NEW OR LITTLE KNOWN, PART II

By ARTHUR C. BAKER, *Bureau of Entomology, Washington, D. C.*

GENUS MYZOCALLIS Pass

Myzocallis punctatellus (Fitch). (1855, p. 165.) This species has been placed as a synonym of *caryella* by Oestlund (1887, p. 45). The type specimen which is in the U. S. National Museum collection proves this not to be the case. The type is not in perfect condition, having lost the abdomen, one antennæ, the unguis of the other and both hind wings. However, enough of the specimen remains to make a determination positive and this remnant has been well mounted by Mr. Pergande. The antenna remaining on the type measures as follows: III, 0.592 mm.; IV, 0.496 mm.; V, 0.368 mm. Segment III is armed with seven rather large sensoria forming a row along the segment. The vertex and crown are armed with a number of tubercles on which spines are mounted. The wings are without markings excepting a clouding around the edge of the stigma and bands of brown bordering the veins. This bordering of the veins is rather faint in the type which is no doubt somewhat faded.

Mr. Davis kindly sent me specimens of an undescribed species from the Monell collection. These specimens, No. 370 X, are undoubtedly *punctatellus*. The banding along the veins is more distinct and the specimens are in good shape. They are alate viviparous females. The following description is drawn up from the specimens.

ALATE VIVIPAROUS FEMALE: Antennæ as follows: III, 0.576 mm.; IV, 0.432 mm.; V, 0.336 mm.; VI (0.144 mm. + 0.32 mm.). Segment III, with usually five large circular sensoria in a row. Labium short. Abdomen with two pairs of very prominent finger-like tubercles and with several smaller ones. Length of the larger pair of these tubercles about 0.16 mm. Cornicles about 0.065 mm. Length of fore wing 2.56 mm. Length from vertex to tip of cauda 1.44 mm.

General color pale yellowish. Antennal segments ringed with brown at their distal extremities; tarsi, abdominal tubercles and a spot near the distal extremity of the femora dark brown; wings banded with brown as previously described.

A form occurs in a collection taken on oak at New Haven, Conn., June 27, 1913, by H. L. Trowbridge, on oak, New Haven, Conn., July 25, 1912, by J. K. Lewis, and in a collection taken on oak at Vienna, Va., August 23, 1912, by the writer. This form agrees with the specimens mentioned previously in all details excepting the markings of the wings. It is true that larger or smaller specimens show longer or shorter antennæ, but this might be expected. Among the specimens in these collections great variation is met with in the markings of the wings. In several specimens the markings have a tendency to be arranged along the veins. From this fact and the very close measurements and structural details the writer feels that the specimens may all represent the same species. He is, therefore, calling them *punctatellus*. Abundance of material may, however, prove two species present.

Myzocallis alnifolia Fitch. (1851, p. 67.) This species occurs throughout the Eastern States on alder and is recorded in our literature as *alni* Fab. The European insect seems to be different from our form and this is shown particularly in the oviparous female. In specimens of the oviparous female of *alni* determined by Schouteden the third segment of the antennæ is armed with prominent hairs. The other segments sometimes also have them although no sensoria are met with on the antennæ. The hind tibiæ are swollen and covered with numerous sensoria as is usual with many of such forms. *Alnifolia* on the other hand has no such prominent hairs on the antennæ of the oviparous forms. The third segment, however, is armed with several sensoria in all adult specimens examined by the writer. These two differences would seem to indicate that the American form is distinct from the European.

The types of *alnifolia* have seemingly been lost. It is most probable that they were destroyed during the years between Fitch's death and the time his collection was brought to Washington. In looking over the Fitch collection the writer found the positions in which the specimens were pinned, but the specimens have disappeared. It would appear, therefore, that the determination can never be positively proven. The description, however, fits the insect well. In his notes Fitch first described the species as *Aphis alnicolens*, which name he afterwards changed. In his collection there were no specimens bearing this name.

Myzocallis californicus n. sp. Taken on *Quercus lobata* Nee, Walnut Creek, Cal., April 6, 1916, by W. M. Davidson. Although not a Eastern species the present form is here described in order that it may be included in the key of American species of the genus. It seems to be somewhat related to *fumipenellus* Fitch.

ALATE VIVIPAROUS FEMALE: Morphological Characters: Antennæ with the following measurements: Segment III, 0.72 mm.; IV, 0.432 mm.; V, 0.352 mm.; VI (0.144 mm. + 0.16 mm.). Segment III is armed with about 4 circular sensoria considerably separated. Abdomen armed with three pairs of prominent finger-like tubercles tipped with stout hairs. Cornicles rather long and narrow for the genus, 0.112 mm. long. Cauda quite deeply bilobed, suggesting that of *fumipennellus* Fitch; cauda very distinctly knobbed. Length of forewing, 2.4 mm.; length from vertex to tip of cauda about 1.7 mm.

Color Characters: General color pale yellowish green; eyes, distal extremities of the antennal segments, the tarsi, a spot on the proximal extremities of the tibiae and a small area on each end of the tibiae brown. Otherwise uniform yellowish green, the eyes of the embryos showing through the abdomen as small red spots.

Described from alate viviparous females in balsam mounts.

Type in U. S. National Museum. Cat. No. 20341.

Myzocallis fumipennellus (Fitch). (1855, p. 166.) This seemingly rare species is known to the writer only from the type now in the National Museum and from the type of *caryæfolia* Davis, in the same collection. The two seem to be identical. Fitch's type is not entire but consists of the head and thorax with the third segment of one antenna and part of the other, the wings and the legs. The abdomen of course is shrunken. The parts remaining, however, are very characteristic and leave little doubt that the species described by Davis is the *fumipennellus* of Fitch.

Wilson placed this species in the genus *Callipterus* as the only American form. It is quite distinct, however, from the type of the genus, and is no doubt a *Myzocallis*. So far as the writer is aware no species of *Callipterus* occur in this country.

The excellent description given by Davis (1910, p. 198) has placed this species definitely in the literature and it only remains to transfer Fitch's name to his description.

Myzocallis tiliæ (L). Taken on *Tilia*, New Haven, Conn., July 14, 1909, by A. I. Bourne. Conn. No. 1-16/109. This well-known species seems to occur commonly wherever its host tree is grown. The genus *Eucallipterus* has been erected with this form as type. There is no doubt that the species considered without other forms shows a considerable difference from the type of *Myzocallis*. Three species might be separated and included in *Eucallipterus*; *tiliæ* L., *bellus* Walsh and *walshi* Mon. The only real character to separate *tiliæ* is the deeply bilobed nature of the anal plate as compared with the shallow bilobed anal plate of *Myzocallis*. Some species of *Myzocallis*, as *trifolii* Mon., often have a distinctly bilobed anal plate. The cauda and anal plate of *bellus* Walsh are very close indeed to those of *tiliæ* and there would be no difficulty in separating these two species from the type of *Myzocallis*. *Walshi* Mon. is very close in general structure to *bellus* Walsh; so close indeed, that it has by some been placed as a

synonym. Yet when we come to examine the anal plate of *walshi* we find that many specimens show a typical *Myzocallis* anal plate. The prothorax in *tiliæ* is somewhat different from that of most species of *Myzocallis* and this is also approached by *bellus* and *walshi*. Yet other species vary toward it. Here then we have the choice of placing *tiliæ* and *bellus* in *Eucallipterus* and most specimens of *walshi* in *Myzocallis* or of transferring *tiliæ* to *Myzocallis* wherein *bellus* was described and the other species since placed. The latter method has been adopted by the writer in that it would seem to simplify matters. The species needs no descriptive remarks since an excellent description has been given by Davis. (1909, p. 33.)

The following key will distinguish the American species of *Myzocallis*.

KEY TO AMERICAN SPECIES OF MYZOCALLIS

(Alate viviparous females)

1. Dorsum of abdomen with finger-like tubercles 2
Dorsum of abdomen without such tubercles 7
2. Unguis of segment VI about equal in length to the base 3
Unguis of VI twice as long as base *punctatellus* (Fitch)
3. Cornicles long (nearly 0.112 mm.) abdomen greenish 4
Cornicles short (0.064 mm. or less) 5
4. Segment VI less than width of head across eyes *californicus* Baker
Segment VI much longer than width of head across eyes *pasaniæ* Davidson
5. Segment III of antennæ shorter than the width of head across eyes, abdominal tubercles setose and dark brown; cornicles about 0.06 mm.
funipennellus (Fitch)
Segment III longer than width of head across eyes 6
6. Cornicles about 0.06 mm. long and black *quercus* (Kalt.)
Cornicles about 0.032 mm. long and not black *ulmifolii* (Mon.)
7. Entire margin of wing with a rather broad dark brown band 8
Margin of wing without such dark brown band 10
8. Unguis of segment VI more than twice as long as base, hind tibiæ yellowish
walshi (Mon.)
Unguis of segment VI less than twice as long as base 9
9. Antennæ distinctly annulated with dark brown; segment III with 10 to 12 oval sensoria, tips of the wing veins marked with brown *tiliæ* (L.)
Antennæ uniform yellowish or dusky; segment III with about four circular sensoria; tips of wing veins not marked with brown *bellus* Walsh
10. Unguis of segment VI about equal to or less than the length of the base 11
Unguis of segment VI considerably longer than the base 14
11. Abdomen with a number of dark spots 12
Abdomen uniform green or yellowish green 13
12. Antennæ annulated, segment III with 4 to 8 sensoria close to base of segment
arundicolens (Clark)
Antennæ yellowish or dusky; segment III with a row of 10 or 12 sensoria covering about three-quarters of the segment *trifolii* (Mon.)
13. Anal vein and base of cubitus and of media much heavier than the other veins of the wing *alnifolia* (Fitch)
Venation nearly uniform *robinia* (Gill.)

14. Wings more or less banded or mottled with dark brown 15
 Wings not so banded or mottled 16
15. Cornicles and a patch around their bases black *discolor* (Mon.)
 Cornicles and a patch around their bases yellow *asclepiadis* (Mon.)
16. Unguis of segment VI three times as long as base *coryli* Gøtz
 Unguis of segment VI about twice as long as base 17
17. Abdomen with four rows of dark brown markings *castanicola* Baker
 Abdomen without dark brown markings *punctatus* (Mon.)
- N. B. *Callipterus genevii* Sanb. is a synonym of *trifolii* Mon.
Callipterus hyalinus Mon. is a synonym of *punctatus* Mon.
Callipterus castaneæ Buckton has been renamed *castanicola* n. n. Baker

GENUS MONELLIA Oest.

Monellia costalis (Fitch). (1855, p. 165.) Taken on hickory leaves, New Haven, Conn., June 27, 1910, by W. E. Britton. Conn. No. 1-16/70.

In order to determine positively whether or not the specimens collected are this species the writer examined the Fitch collection and located the type specimen still bearing the original number mentioned in Fitch's note book. Since there was only one specimen in Fitch's collection and one specimen only referred to in his notes, there can be positively no doubt about this specimen being the type. Descriptive notes follow:

ALATE VIVIPAROUS FEMALE: Antennal segments as follows: III, 0.352 mm.; IV, 0.256 mm.; V, 0.256 mm.; VI (0.16 mm. + 0.176 mm.). Segment III with five or six oval sensoria on the swollen 0.128 mm. of the segment. Abdomen with three rather large rounded gibbous tubercles on each side of abdomen. Length of forewing 1.144 mm. Length from vertex to tip of abdomen 1.76 mm.

Color yellowish; antennæ yellow ringed with dark brown; vertex lined with dark brown and a line extending down each side from eyes to past the caudal pair of the lateral tubercles mentioned. Fore wings with a broad brown band extending along the costal margin to beyond the stigma, this band interrupted just mesad of the stigma.

KEY TO THE AMERICAN SPECIES OF MONELLIA

(Alate viviparous females)

1. Costal margin of wing with a broad brown band extending beyond the stigma, tibiæ yellow, antennæ annulated with brown *costalis* (Fitch)
 Costal margin of wing without such broad band though in some cases with the costal vein brown 2
2. Tibiæ, antennæ and costal vein dark brown to black *californica* Essig
 Tibiæ and costal vein yellowish, antennæ annulated with dark brown 3
3. Abdomen with rows of dark brown spots; the unguis of Segment VI of antennæ longer than or equal to the base *caryæ* (Mon.)
 Abdomen without such spots; the unguis of segment VI of antennæ considerably shorter than the base *caryella* (Fitch)

GENUS EUCERAPHIS Walker

Euceraphis betulae (Koch). Taken on Japanese maple, Hartford, Conn. Sept. 11, 1905, by C. N. Ruedlinger, Conn. No. 1-16/145.

This species may be distinguished by the black marking upon the abdomen, the wax pores, the color of the legs and the proportions of the antennal segments and the width of the head.

The abdomen of the alate vivipara is marked with a large quadrate more or less broken dark brown patch. Within this patch there are lighter somewhat oval areas which constitute the wax plates. These areas are composed of small circular pores very variable in number in the different plates. The hind tibiae are light in color with the distal extremities and tarsi black. The antennal segments measure as follows: III about 1.456 mm.; IV, 1.008 mm.; V, 0.8 mm.; VI (0.256 + 0.256 mm.). The head is about 0.6 mm. in width across the eyes.

Dr. Fitch described a member of the present genus under the name of *Aphis cerasicolens*. (1851, p. 65.) The type of this species is not in good condition. It was mounted from the Fitch collection by Mr. Theo. Pergande. As far as the writer is able to tell from an examination of the specimen this name is a synonym of *betulae*.

Euceraphis mucidus (Fitch). (1856, p. 334.) Taken on black birch, New Haven, Conn., July 1913. Conn. No. 1-16/19.

The writer has examined the specimens of this species from the Fitch collection and compared them carefully with the Connecticut material and specimens from other regions. He is thus able to give a positive determination.

ALATE VIVIPAROUS FEMALE. Morphological Characters: Antennae about as follows though somewhat longer or shorter in larger or smaller specimens. Segment III, 1.984 mm.; IV, 1.408 mm.; V, 1056 mm.; VI (0.448 mm. + 0.384 mm.). Segment armed with a few short, stiff, spine-like hairs. Segment III, with about 30 narrow oblong transverse sensoria upon the basal half of the segment. The extreme basal portion is without sensoria and that part which is covered with sensoria is somewhat swollen. Distal segments rather strongly imbricated; width of the head across the eyes about 0.64 mm.; vertex with a few short spine-like hairs and somewhat projecting forward to the median ocellus but without tubercles or projecting areas above. Cornicles nearly 0.16 mm. long and about 0.117 mm. broad at the base. Anal plate slightly notched; tibiae very thickly covered with minute subcircular pore-like areas which are hardly as large as the tubercles forming the bases of the hairs on these segments. Dorsum of abdomen without apparent wax gland areas. Length from vertex to tip of cauda 2.88 mm.

Color Characters: Antennae uniform black. In the pupa some specimens show only the distal segments black. Body pale green. Abdomen without the black markings met with in *betulae*. Wings transparent, the veins sometimes noticeably dark brown. Stigma bordered below usually with dark brown or black. Femora whitish, tibiae and tarsi black.

Body covered with a thick powdery material. Legs and sometimes parts of body covered with flocculent mealy down which assists the insect in floating through the air.

Besides the proportions, the distinguishing characters of this species are the uniform black antennæ and the absence of markings upon the abdomen. The most important character, however, is nature of the tibiæ. What appears to be the same species as *mucidus* was described by Fitch as *Aphis pinicolens*. (1851, p. 66.) The type of this species in the U. S. National Museum is in very poor condition. The tibiæ show the large number of minute pore-like structures met with in *mucidus*. The tibiæ, however, are not uniform black as in the type of *mucidus* and in the collected material of that species. Only their tips are dark brown. This may be due to the fading of the type specimen. No collected specimens which agree in all details with this type of *pinicolens* have been seen by the writer. He therefore withholds judgment in regard to the use of the name *pinicolens*.

Eucерaphis brevis n. sp. Taken on "cut-leaf" white birch, Middletown, Conn., May 3, 1906, by Morris B. Crawford, Bureau of Entomology No. 9541, and on *Betula* sp., Ithaca, N. Y., May 15, 1911 by E. M. Patch, Me. Exp. Sta. Acc. No. 20-11.

ALATE VIVIPAROUS FEMALE: Morphological Characters: Antennal segments as follows: III, 1.2 mm.; IV, 0.672 mm.; V, 0.528 mm.; VI, (0.176 + 0.128 mm.). Segment III, with 18 or 20 sensoria close together upon the basal third of the segment. Distal segments imbricated; width of head across the eyes about 0.64 mm.; vertex with two slight projections above abdomen with large lateral protuberances. Cornicles about 0.128 mm. long. Anal plate entire; length from vertex to tip of cauda 2.4 mm.

Color Characters: General color greenish; antennæ shaded with dusky becoming black on the distal segments; legs with the tarsi and distal extremities of the tibiæ black. The distal extremities of the femora are also sometimes more or less black.

Described from alate viviparous females in balsam mounts.

Type in U. S. National Museum. Cat. No. 20342.

Eucерaphis lineata n. sp. Taken on birch at Durham, N. H., Oct. 19, 1903, by C. M. Weed, Bureau of Entomology No. 9315 D., and on *Betula populifolia*, Orono, Me., July 21, 1906, by E. M. Patch, Me. Acc. No. 83-06.

ALATE VIVIPAROUS FEMALES: Morphological Characters: Antennæ with the following measurements: Segment III, 1.68 mm.; IV, 1.36 mm.; V, 0.928 mm.; VI (0.096 mm. + 0.4 mm.). Segment III with about 25 sensoria on the basal 0.64 mm. Width of head across the eyes 0.64 mm.; vertex without projections, antennæ rather close together. Length from vertex to tip of cauda 3.12 mm.; length of forewing 4.5 mm.; anal plate rounded or very slightly indented.

Color Characters: General color greenish yellow; antennæ dusky with blackish distal annulations on the segments; tarsi, distal extremity of labium and distal extremity of the femora and tibiæ dark brown. The tibiæ has, moreover, a longitudinal dark brown stripe extended for nearly its entire length. Abdomen without dark brown markings but with the eyes of the young showing as dark brown spots.

Described from specimens in balsam mounts.

Type in U. S. National Museum. Cat. No. 20343.

Euceraphis deducta n. sp. Taken on birch, Orono, Me., June 12, 1907, by E. M. Patch, Me. No. 4-07.

This species is easily distinguished from all others in the genus by the proportions of segment VI of the antenna.

ALATE VIVIPAROUS FEMALE: Morphological Characters: Segment III, 1.68 mm.; IV, 0.88 mm.; V, 0.8 mm.; VI (0.48 mm. + 0.144 mm.). Segment III, with about 20 sensoria on the basal 0.56 mm. Width of head across the eyes 0.64 mm. Cornicles and anal plate normal for the genus. Length from vertex to tip of cauda 2.4 mm. Length of forewing 3.52 mm.

Color Character: Color apparently a uniform yellowish green. Antennæ, tips of femora and tibiæ and the tarsi dusky. Eyes dark brown; wings unmarked excepting the tips of the veins which are shaded with brown.

Described from specimens in balsam mounts.

Type in U. S. National Museum. Cat. No. 20344.

The following key will distinguish the American species of *Euceraphis*.

KEY TO THE AMERICAN SPECIES OF EUCKERAPHIS

(Alate viviparous females)

1. Anal plate distinctly but not deeply bilobed. Segment III of antennæ with eight or nine sensoria. *flava* Davidson
 Anal plate entire or but slightly indented. 2
2. Tibiæ uniform black and covered thickly with a large number of small, clear pores. *mucidus* (Fitch)
 Tibiæ not uniform black and without such pores. 3
3. Abdomen with a large dark brown patch in which are clear wax pore areas *betulæ* (Koch)
 Abdomen without such dark patch and wax pore areas. 4
4. Combined length of base and unguis of segment VI about equal to half of the diameter of the head across the eyes. *brevis* Baker
 Combined length of the base and unguis of segment VI about equal to or much more than the diameter of the head across the eyes. 5
5. Unguis of segment VI less than one third of the length of the base. *deducta* Baker
 Unguis of segment VI considerably more than two-thirds as long as the base. 6
6. Hind tibia with a longitudinal black stripe on its outer edge; segment III with about twenty-five sensoria. *lineata* Baker
 Hind tibia with only the distal extremity black and segment III with about fifteen sensoria. *gillettei* Davidson

GENUS CALLIPTERNELLA Goot.

Callipternella annulata (Koch). Taken on *Betula populifolii* at Veazie, Me., by E. M. Patch, July 22, 1909. Maine No. 82-09. On white birch, New Haven, Conn., July 7, 1909, by A. I. Bourne, Conn. No. 1-16/142. On birch, New Haven, Conn., by A. B. C., June 28, 1911, Conn. No. 1-16/18 and on birch at Madison, Wis., by J. J. Davis, June 7, 1913. What is evidently the same species was mentioned by Gillette (1910) as occurring upon Birch. Vander Goot (1913, p. 113) has placed this form as the same species as *annulatus* Koch.

ALATE VIVIPAROUS FEMALE: Morphological Characters: Antennæ measurements as follows: I, 0.08 mm.; II, 0.048 mm.; III, 0.48 mm.; IV, 0.288 mm.; V, 0.176 mm.; VI, (0.096 + 0.24 mm.). Segment III, armed with from 5 to 7 circular sensoria in an even row on the basal two-thirds of the segment. The sensorium at the base of the unguis of VI, rather elongate, all permanent sensoria fringed; vertex somewhat protruding and armed with prominent hairs about 0.08 mm. long. Cornicles about 0.08 mm. long, distinctly imbricated but not reticulated. Wings usual, forewing about 2 mm. long and with the radial sector faintly indicated or almost absent. Length from vertex to tip of cauda about 1.54 mm. *

Color Characters: Antennæ yellowish with the base, the distal segments and the distal extremities of III and IV brown; legs, cornicles, transverse bands and lateral spots on the abdomen dark brown to black. Wing veins faintly bordered with dusky; stigma dusky with a clear central area.

APTEROUS VIVIPAROUS FEMALE: Morphological Characters: Antennal measurement as follows: I, 0.064 mm.; II, 0.048 mm.; III, 0.48 mm.; IV, 0.24 mm.; V, 0.224 mm.; VI (0.096 + 0.304 mm.). Segment III, with about 8 circular sensoria in a row on the basal two-thirds of the segment. Hairs on the vertex about 0.15 mm. long. Cornicles about 0.096 mm. long, imbricated, not reticulate. Length from vertex to tip of cauda about 1.92 mm. Abdominal hairs of about equal length with those on the vertex. Dorsum of abdomen covered with minute projections giving it an almost granular appearance.

Color Characters: General appearance dark brown. Antennal segments III and IV with dark distal extremities, the distal portions of the antennæ entirely dark. Legs dark brown. Head and thorax with large dark brown area. Abdomen marked with large dark brown lateral patches and with transverse dorsal bands of dark brown one on each segment. Remainder yellowish.

GENUS CHAITOPHORUS Koch.

Chaitophorus lyropicta Kess. Taken on the Norway maple, Meriden, Conn., June 26, 1912, by Louis A. Guidebrod. Conn. No. 1-16/14.

This species is abundant upon the Norway maple throughout the eastern section of the United States. The insect is usually considered in America under the name of *aceris*. It may be distinguished by the proportions of the sixth segment of the antennæ. The species varies considerably in size; the antennæ of the alate vivipara averaging about as follows: III, 0.592 mm.; IV, 0.368 mm.; V, 0.32 mm.; VI (0.112 mm. + 0.512 mm.). Segment III is armed with a more or less even row of from 4 to 9 sensoria.

So far as the writer has been able to discover this species never produces dimorphs.

Chaitophorus americanus n. sp. Taken on sugar maple, Brookfield Center, Conn., May 10, 1913, by C. Holder; Conn. No. 1-16/13, on *Acer* sp., Orono, Me., June 1, 1909, by E. M. Patch; Me. No. 18-09 on *Acer circinatum* at Hoquiam, Wash., June 1903, by A. D. Hopkins and on the same tree at Hoquiam, Wash., August 1903, by H. E. Burke, Bureau of Entomology, No. 9797.

There seems to have been considerable confusion in regard to the species of *Chaitophorus* producing dimorphic forms. Two species

occur in Europe and two in America. The European species are *aceris* L. and *testudinatus* Thorn. Of these the latter species has dimorphs margined with lamellæ whereas the dimorphs of *aceris* are armed only with long stout hairs. The two species in this country *negundinis* Thos., and the present one both have dimorphs margined with lamellæ. *Negundinis* is found upon the Manitoba maple (*Acer negundo*), whereas *americanus* feeds on the trees mentioned previously. The two species are easily distinguished.

ALATE VIVIPAROUS FEMALE: Morphological Characters: Antennæ showing considerable variation, but being about as follows: Segment III, 0.72 mm.; IV, 0.44 mm.; V, 0.34 mm.; VI (0.128 mm. + 0.368 mm.). Segment III, armed with from 18 to 24 irregularly placed sensoria which often give the segment a more or less swollen appearance. Antennal hairs long and prominent; about 0.16 mm. on Segment III. Cornicles about 0.24 mm. long and covered with reticulate areas; length from vertex to tip of cauda 3.1 mm.

Color Characters: General color dark green. Head, antennæ, thoracic lobes, sternal plate and cornicles black. Abdomen with a row of transverse black bands on the dorsum and with a row of more or less circular black spots along the margin.

DIMORPH: Morphological Characters: Antennal segments as follows: III, 0.16 mm.; IV (0.064 mm. + 0.24 mm.). First segment large, projecting forward; vertex and entire margin of the body with the exception of the lateral margins of the head covered with a row of lamellæ. On the lateral margins of the head the lamellæ are replaced by lanceolate spines. Similar spines also occur upon the outer margins of the legs; dorsum apparently without plate-like structures.

Color Characters: Pale greenish with red-brown eyes.

Described from specimens in balsam mounts. Type in U. S. National Museum. Cat. No. 20345.

Chaitophorus viminalis Mon. (1879, p. 31.) Taken on *Populus grandidentata*, New Haven, Conn., June 29, 1914, by M. P. Zappe. Conn. No. 1-16/24.

A study of the type of this species kindly sent to the writer by Mr. J. J. Davis, and numerous specimens from different localities proves that the species always possesses a granular surface on the skin, although this granulation varies considerably in degree. The color also varies from a light green to a dark brown.

Chaitophorus nigræ Oest. (1887, p. 40.) Taken on willow at Galesville, Conn., July 15, 1909, by B. H. Walden. Conn. No. 1-16/125.

In studying a series of specimens thought to be this species it was noted that the reticulate marking of the skin was a constant character. Professor Oestlund kindly examined his type and informed the writer that this character is present in the type. It seems, therefore, that *nigræ* may be separated from *viminalis* on this character and on the sensoria. The type of *cordata* Wms., proves it to be the same species.

Chaitophorus bruneri Wms. (1910, p. 25.) Taken on poplar,

New Haven, Conn., July 8, 1909, by A. I. Bourne. Conn. No. 1-16/132.

This species is very close indeed to *populicola* Thos., as that insect is at present understood. A large series of the latter species shows considerable variation and a more thorough study should be made of bred material. The co-types of *bruneri* in the National Museum collection consist of alate forms and apterous females. The principal differences noted between these types and the average specimens of *populicola* are, apart from the size, the antennæ and the body hairs. Segment IV of the alate form has no sensoria or one, whereas in the same segment of *populicola* there are usually several. In many cases, however, this segment in specimens of *populicola* shows only one sensorium. The apterous specimens of *bruneri* on the Connecticut slide, as well as one specimen on the type slide, show hairs which are stout and notched at the tip. This character is also shown in a collection taken for *populicola* in Minnesota. All the other material of *populicola* which the writer has examined shows long normal hairs. This character of the hairs showing in such few specimens may possibly be a specific indication but the writer retains *bruneri* not on the strength of these hairs, but on account of a lack of material suitable for dissection and study in order to fix its status. The following measurements have been made from the cotypes in the National Museum collection.

ALATE VIVIPAROUS FEMALE: Antennæ as follows: Segment III, 0.416 mm. with 17 sensoria; IV, 0.224 mm.; V, 0.208 mm.; VI (0.128+0.16 mm.), Cornicles 0.112.

APTEROUS VIVIPAROUS FEMALE: Antennal segment III, 0.368 mm.; IV, 0.208 mm.; V, 0.208 mm.; VI (0.112 mm. + 0.144 mm.).

KEY TO THE AMERICAN SPECIES OF CHAITOPHORUS

(Alate viviparous females)

1. Wing veins heavily bordered with dark brown 2
Wing veins not heavily bordered with dark brown 4
2. Antennæ with very few hairs (apterous form with thick spines) . . . *quercicola* (Mon.)
Antennæ noticeably hairy 3
3. Segment III of antennæ usually with several sensoria (apterous form with straight spine-like hairs) *populicola* Thos.
Segment III of antennæ usually with one sensorium (apterous form with notched spine-like hairs) *bruneri* Wms.
4. Feeding upon species of maples 5
Feeding upon species of willow and poplar 7
5. Segment III of antennæ with 16 to 24 sensoria somewhat irregularly placed on the basal three quarters of the segment *americanus* Bkr.
Segment III of antennæ with 4 to 9 sensoria in a more or less even row 6
6. Unguis of segment VI less than three times as long as the base . . . *negundinis* Thos.
Unguis of segment VI much more than three times as long as the base, often more than four times as long *lyropicta* Kess.
7. Vertex and crown covered with reticulate areas (dorsum of apterous form reticulate) 8

- Vertex and crown without reticulations but these replaced by granulations (especially on apterous form) Segment IV with 0 to 2 sensoria. *viminalis* Mon.
8. Segment IV with 4 to 6 sensoria. *nigra* Oest.
- Segment IV with no sensoria. *salicicola* Essig
- N. B. *Chaitophorus agropyronensis* Gillette is a species of *Sipha*
Chaitophorus flabellus Sanborn is a species of *Saultusaphis*
Chaitophorus betulæ Buckton of Gillette is a species of *Callipternella*
Chaitophorus artemisiæ Gillette seems to be the same form described as
Cryptosiphum canadensis by Williams. It is not a *Chaitophorus*.
Chaitophorus spinosus Oest., is a synonym of *quercicola* Mon.
Chaitophorus cordata Wms., is a synonym of *nigra* Oest.
Chaitophorus stercoris Sanborn is a synonym of *viminalis* Mon.
Chaitophorus delicata Patch is known only from the apterous forms and is therefore not included in the key
Chaitophorus tridentata Wlsm., the writer has not seen.

GENUS PTEROCOMMA Buckton

Pterocomma media n. sp. Taken on poplar, Manchester, Conn., Sept. 3, 1909, by A. I. Bourne Conn. No. 1-16/126 and on Carolina poplar, New Canaan, Conn., Sept. 21, 1909, by A. I. Bourne, Conn. No. 1-16/127.

ALATE VIVIPAROUS FEMALE: General appearance similar to *beulahensis* Ckll., from which it differs chiefly in the antennæ and cornicles. Antennæ as follows, III, 0.56 mm.; IV, 0.32 mm.; V, 0.272 mm.; VI (0.16 mm. + 0.192 mm.). Segment III is covered with a large number of rather small circular sensoria; more distal segments without sensoria. Cornicles 0.256 mm. long, slightly stouter than those of *beulahensis*, being about 0.096 mm. in their greater diameter. They are flanged and somewhat swollen in the middle. Length of forewing 4.28 mm. Hind tarsus 0.24 mm. long, labium extending to the hind pair of coxæ. Length from vertex to tip of cauda about 3 mm. The color characters cannot be obtained from the mounted specimens and no color notes were taken.

APTEROUS VIVIPAROUS FEMALE: Antennal segments as follows: III, 0.544 mm.; IV, 0.256 mm.; V, 0.24 mm.; VI (0.144 mm. + 0.176 mm.). Segments without sensoria. Cornicles 0.256 mm.; hind tarsi 0.24 mm. Labium extending almost to hind pair of coxæ; length from vertex to tip of cauda about 3 mm.

Described from specimens in balsam mounts.

Type in U. S. National Museum. Cat. No. 20346.

KEY TO THE AMERICAN SPECIES OF PTEROCOMMA

(Alate viviparous females)

1. Cornicles without a distal flange and abruptly constricted at the distal extremity. *focculosa* (Weed)
- Cornicles with a distal flange and not so abruptly constricted at their distal extremities. 2
2. Cornicles about twice as long as their greatest diameter. *smithiæ* (Mon.)
- Cornicles much more than twice as long as their greatest diameter. 3
3. Cornicles about equal in length to the hind tarsi. 4
- Cornicles much longer than the hind tarsi. 6
4. Cornicles cylindrical, beak long. *populea* (Kalt.)
- Cornicles somewhat swollen, beak short. 5

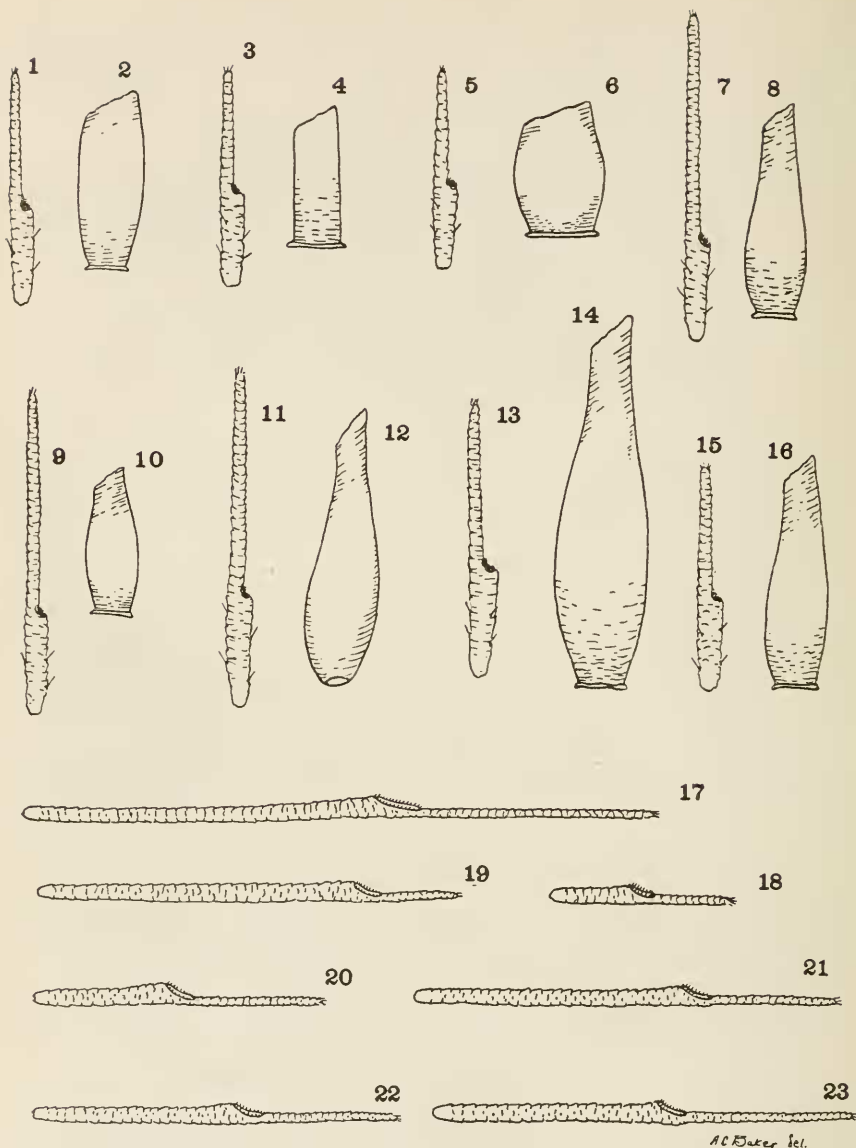


Fig. 21. *Pterocomma media*. 1, distal segment of antenna. 2, cornicle. *P. populea*. 3, distal segment of antenna. 4, cornicle. *P. smithia*. 5, distal segment of antenna. 6, cornicle. *P. bicolor*. 7, distal segment of antennæ. 8, cornicle. *P. beulahensis*. 9, distal segment of antenna. 10, cornicle. *P. flocculosa*. 11, distal segment of antenna. 12, cornicle. *P. salicis*. 13, distal segment of antenna. 14, cornicle. *P. populifolia*. 15, distal segment of antenna. 16, cornicle. *Eucercaphis lineata*. 17, distal segment of antenna. *E. brevis*. 18, distal segment of antenna. *E. deducta*. 19, distal segment of antenna. *E. betula*. 20, distal segment of antennæ. *E. mucida*. 21, distal segment of antenna. *E. flava*. 22, distal segment of antenna. *E. gillettii*. 23, distal segment of antennæ. All figures drawn to the same scale.

A. C. Water, del.

5. Unguis of segment VI about twice as long as the base. *beulahensis* (Ckll.)
 Unguis of segment VI one and one-half times as long as base. *media* Baker
6. Cornicles nearly twice as long as the hind tarsi. 7
 Cornicles much more than twice as long as the hind tarsi. 8
7. Unguis of segment VI of antennæ about equal in length to the cornicles and
 about twice as long as base. *bicolor* (Oest.)
 Unguis of segment VI of antennæ considerably shorter than the cornicles and
 not twice as long as base. *populifolior* (Fitch)
8. Cornicles swollen in the middle, bright orange in color. *salicis* (Linn.)
 N. B. *Melanoxantherium antennatum* Patch is known only from the oviparous
 female.

LITERATURE REFERRED TO IN TEXT

1851. FITCH, ASA. Cat. with references and descriptions of the insects collected and
 arranged for the State Cabinet of Natural History. In 4th Ann. Rept. State
 Cab. Nat. Hist., pp. 43-69.
1855. FITCH, ASA. Report on the Noxious and Other Insects of the State of New
 York. In Trans. N. Y. State Agr. Soc., vol. 14, 1854, pp. 705-880. Also
 printed Albany, N. Y. 176 p.
1856. FITCH, ASA. Third Report on the Noxious and Other Insects of the State of
 New York. In Trans. N. Y. State Agr. Soc., vol. 16, 1856, pp. 315-490.
1879. MONELL, J. T. Notes on Aphididæ with Descriptions of New Species.
 In Bul. of the U. S. Geol. and Geograph. Survey of the Territories, vol. V,
 No. 1, pp. 18-32
1887. OESTLUND, O. W. Synopsis of the Aphididæ of Minn. Bul. No. 4, Geol. and
 Nat. Hist. Survey of Minn., pp. 1-100.
1909. DAVIS, J. J. Studies on Aphididæ II. In Ann. Ent. Soc. Am., vol. II, pp.
 30-45.
1910. DAVIS, J. J. Two Curious Species of Aphididæ from Illinois. In Ent.
 News, vol. XXI, pp. 195-200.
1910. GILLETTE, C. P. Plant-lice Notes—Family Aphididæ. In Jour. Econ.
 Ent. vol. III, p. 367.
1910. WILLIAMS, T. A. Aphididæ of Nebraska. In University Studies, vol. X,
 No. 2, pp. 1-91.
1913. GOOT, P. VAN DER. Zur Systematik der Aphiden. In Tijdschrift voor
 Entomologie, vol. 56, pp. 69-154.
1914. DAVIDSON, W. M. Plant-lice Notes from California. In Jour. Econ. Ent.,
 vol. VII, pp. 127-136.

THE TOMATO AND LAUREL PSYLLIDS

By E. O. ESSIG, *University of California, Berkeley, Cal.*

Psyllids are also known as jumping plant-lice because of their great similarity in appearance and habits to these insects and their ability to jump freely. The family *Psyllidæ* to which psyllids belong is usually placed next to the family *Aphididæ* (plant-lice), in the suborder *Homoptera* and the order *Hemiptera*. In this order are to be found many of the insects which are very injurious to crops grown in California.